Missouri Botanical Garden

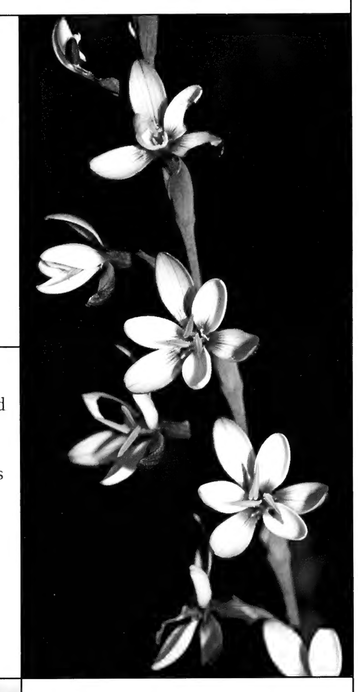
Research: Iridaceae





The grasslands of the Drakensberg Mountains, bordering South Africa and Lesotho, are rich in species of Iridaceae, including autumn-flowering *Gladiolus crassifolius*. The rugged, basalt mountain range rises to over 10,000 feet, and the highest peaks reach over 13,000 feet. Extending from eastern South Africa through Zimbabwe to Tanzania, *G. crassifolius* is one of more than 265 species of this genus of Africa and the Mediterranean and Middle East. Southern Africa is the center of diversity of the Iridaceae. More than 1,100 of the total 2,200 species of the family occur here, most found in the drier, western part of the subcontinent. All are seasonal plants, dying down in the dry season, and sprouting rapidly from their corms after rain.

Hesperantha spicata. Many of the estimated 80 species of the sub-Saharan African genus *Hesperantha* have white flowers that open only at night when they release a strong, sweet, often clove-like scent. Photographed at night, *H. spicata* awaits visits from its settling moth pollinators.





***Gladiolus watermeyeri*.** The cryptically colored flowers of *Gladiolus watermeyeri* of western South Africa are often first detected by their strong, *Viola*-like floral odor dominated by ionone, a chemical that attracts large, anthophorine bees, their legitimate pollinators.

***Crocosmia aurea*,** a widespread African species of evergreen forest and bush, was used as a parent in crosses with other species of the genus to produce the many *Crocosmia* cultivars now in the horticultural trade. The nodding, brilliant orange flowers are adapted for pollination by large butterflies which suck the nectar in the tubular perianth while hanging upside down.

Gladiolus equitans is a rare species of the mountains of Namaqualand, a semi-desert area on the west coast of South Africa. The large red flowers with yellow nectar guides produce a wonderful, rich, sweet scent. Plants most often grow in crevices in rock outcrops where their underground, carbohydrate-rich corms (compact, bulb-like underground stems) are safe from predation by the baboons and porcupines that relish such delicacies.







Temperate southern Africa is a major centre of radiation for Iridaceae. Specialist ecotourists from the United States, Great Britain, and Japan celebrate the botanical diversity of the Cape Flora region.







Crocus sativus. Autumn-flowering *Crocus sativus* is the source of the spice, saffron. The tiny red styles and style branches are harvested by hand from the purple flowers in vast fields of cultivated plants and then dried and packaged. Spain, Italy, and Iran are major suppliers of saffron today. The plant, not known in the wild, was domesticated in the eastern Mediterranean more than 2,000 years ago from wild *Crocus* species.

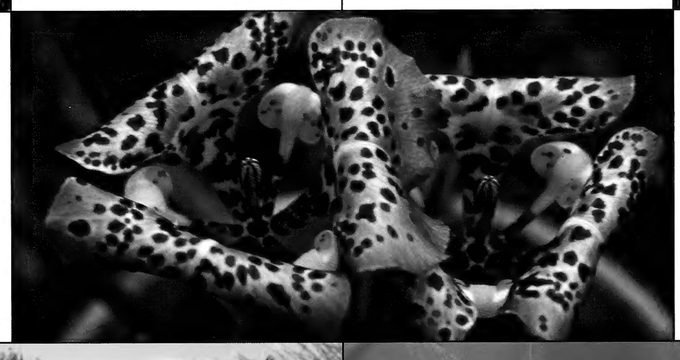
Watsonia stokoei. Periodic wildfires are an essential part of the ecology of South Africa's fynbos vegetation, clearing moribund vegetation and recycling scarce nutrients. *Watsonia stokoei* is one of many geophytes stimulated into mass-flowering by dry-season burning, then making a brilliant display, attracting sun birds, their pollinators.



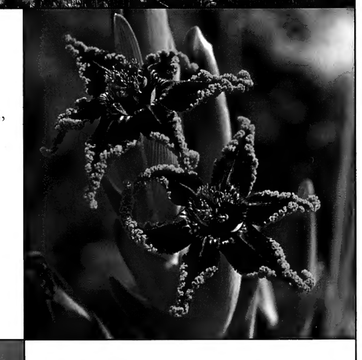
Moraea villosa. Iridescent green markings on the outer tepals of the peacock iris, *Moraea villosa*, from western South Africa, attract hairy scarab beetles. These so-called monkey beetles pollinate more than 50 Iridaceae species in the Cape Flora region. The starkly contrasting markings of this and many other flowers in southern Africa are now known to be beetle marks, which attract scarab beetles to the flowers. As they crawl across the flat tepals, the beetles transfer pollen.



Romulea leipoldtii. The African and Mediterranean genus *Romulea* is closely related to *Crocus*, and like it, has flowers borne close to the ground. This species, *R. leipoldtii*, is a lovely but rare member of this African and Eurasian genus. It is restricted to dry valleys in the winter-rainfall part of South Africa, the center of diversity for the genus.



Kelissa brasiliensis. The extraordinary speckled flowers of the rare Brazilian native, *Kelissa brasiliensis*, last just a single day each, long enough to be pollinated. The small, yellow and white inner tepals produce nectar to attract pollinating insects.





Babiana villosa. Red-flowered *Babiana villosa* is a rare endemic species of western South Africa, but now in cultivation, is a desirable garden subject. The scarlet flowers are pollinated by scarab beetles, several species of which have an innate attraction to red blooms.





Ferraria crispa. The origin of cormous rootstocks in *Ferraria* and *Moraea* is thought to have occurred about 30 million years ago in response to increasing climatic seasonality in southern Africa. *F. crispa,* one of 18 species of this sub-Saharan African genus, is common along the coast and interior mountains of South Africa. The dull-colored flowers produce a strange, sour, molasses-like odor that attracts game and dung and house flies to their sugary nectar.

Iris bismarckii. The bizarrely colored flowers of *Iris bismarckii*, native to Israel and Jordan, have pale, upright inner tepals and brown-speckled outer tepals. The blooms attract solitary bees, which shelter overnight inside them and inadvertently transfer pollen to the next flower they visit the following day.



Moraea pritzeliana. Blue-flowered *Moraea pritzeliana*, a species of the summer-dry western Karoo of South Africa, is one of more than 200 species in this predominantly sub-Saharan African genus, which has just two species in Eurasia. One of them, *M. sisyrinchium*, the Spanish nut, is a close relative of *M. pritzeliana* and probably reached the Mediterranean by long-distance dispersal.



Watsonia zeyheri. The trumpet-shaped flowers of *Watsonia zeyheri* from marshes in the Cape Fold Mountains are pollinated by sunbirds, important pollinators of many geophytes and shrubs in the Cape Flora region of South Africa. *Watsonia*, a genus of some 52 species, is cultivated today in parts of the world with mild climates, including California, southern Europe, and Australia, as well its native southern Africa.

Babiana rubrocyanea, native to a few farms north of Cape Town, South Africa, is almost extinct in the wild. The unsuually marked flowers are mimicked by several co-blooming species of other genera sharing the same scarab beetle pollinators, a striking example of floral mimicry. The dark organs in the center of the flower are anthers and pollen, and may attract scarab beetles to visit the blooms.

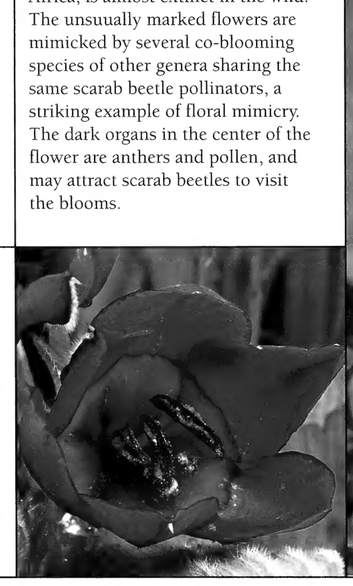


Sparaxis tricolor. Brilliantly marked flowers of the South African *Sparaxis tricolor* serve to attract their pollinators, scarab beetles. The markings are believed to represent beetle marks, which encourage more *Anisocheilus inornatus* beetles to visit and pollinate the blooms. Restricted in the wild to a few populations, the species is fortunately in cultivation and is becoming popular in gardens, as are hybrids between *S. tricolor* and other species of this genus.

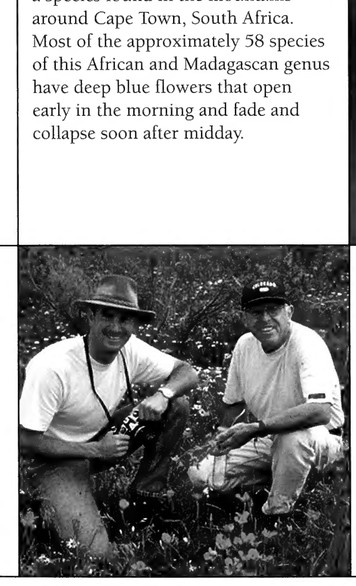
Aristea capitata. The handsome, deep blue flowers of *Aristea capitata*, a species found in the mountains around Cape Town, South Africa. Most of the approximately 58 species of this African and Madagascan genus have deep blue flowers that open early in the morning and fade and collapse soon after midday.



***Trimezia stayermarkii*,** a native of Central America, is one of approximately 20 species of this neotropical genus. The recurved limbs of the inner tepals shelter oil-secreting glands; the oil is a reward for pollinating bees, which use the oil for provisioning nests for their larvae. The species was named in honor of the late Dr. Julian Steyermark, a Missouri Botanical Garden staff member renowned for his pioneering studies of the flora of Venezuela.



Lapeirousia silenoides is one of more than thirty species of Iridaceae and Geraniaceae that produce long-tubed, magenta or dark blue flowers adapted for pollination by the long-proboscid, tangle-veined fly *Prosoeca peringueyi*. This fly is the only insect able to reach the sugary nectar held in the base of the elongate floral tube and, while feeding, pollinate the flowers.



Peter Goldblatt (right), Senior Curator, Missouri Botanical Garden, and colleague **John Manning**, Senior Scientist, South African National Biodiversity Institute, work in the field and laboratory studying the African members of the Iridaceae (Iris family) and Hyacinthaceae (Hyacinth family), both of which have their centers of diversity in sub-Saharan Africa. The two scientists are photographed here in a field of the rare and endangered, orange-flowered *Moraea tulbaghensis*.

Text by Dr. Peter Goldblatt, B.A. Krukoff Curator of African Botany, Missouri Botanical Garden; and Dr. John Manning, Senior Specialist Scientist, Compton Herbarium, South African National Biodiversity Institute, Kirstenbosch

Photos by: Peter Goldblatt and John Manning

Science and Conservation at the Missouri Botanical Garden

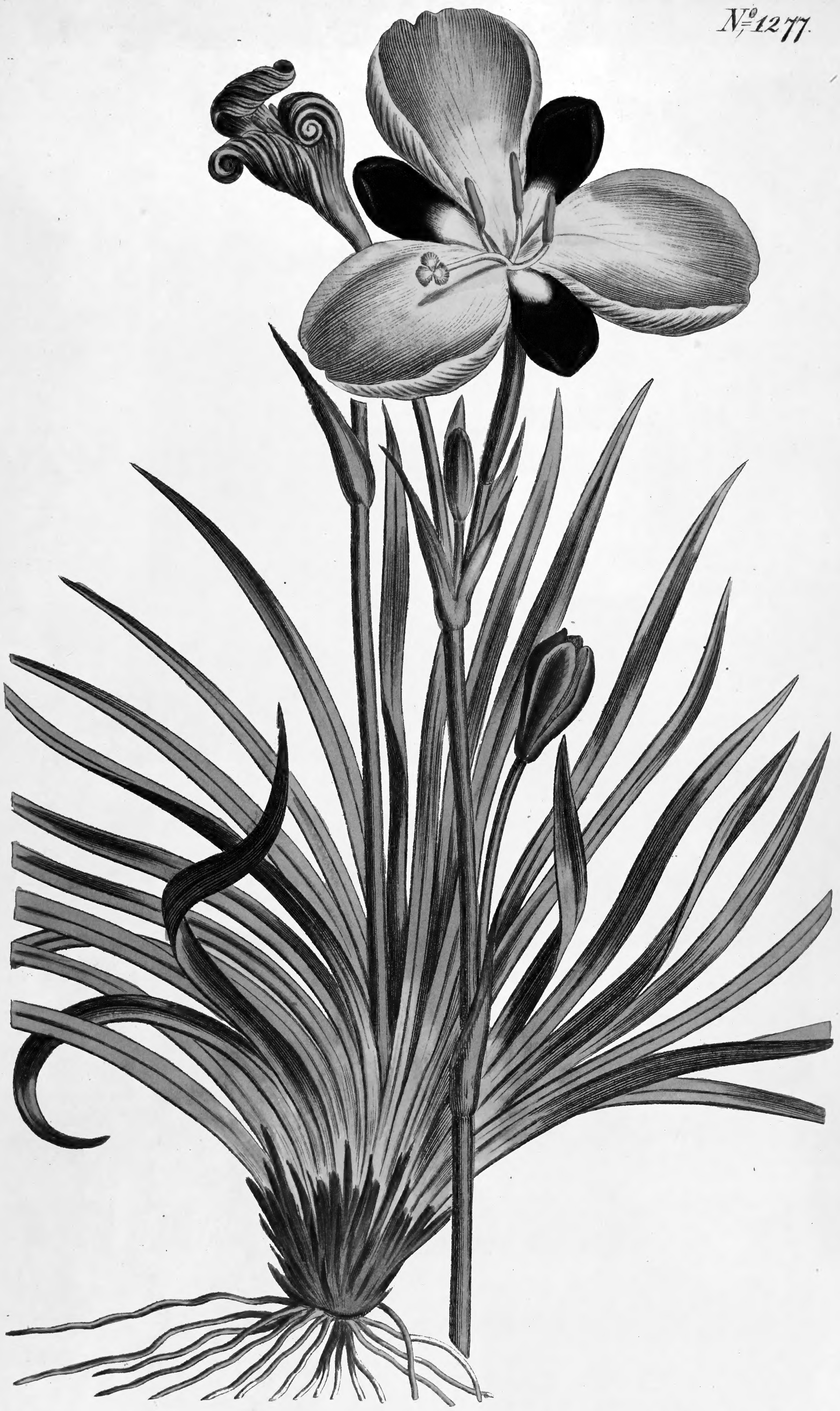
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The research division consists of 46 Ph.D. botanists assisted by 144 support staff and 20 graduate students. Studies concentrate on the plants of Meso- and South America, sub-Saharan Africa, Madagascar, China, Vietnam, and North America.

Individual Garden scientists are specialists in the plants of particular regions, in the systematics and evaluation of major plant families, and in the interactions between plants and people.

The Garden serves as the headquarters for the Center for Plant Conservation and for several major collaborative publications, such as *Flora of China* and *Flora Mesoamericana.*

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Aristea lugens

A narrow endemic species of the hills around Cape Town, South Africa, *Aristea lugens* was first collected in the 1770s by Swedish botanist and plant explorer Carl Peter Thunberg. Although Thunberg intended to name the species himself, Carl Linneaus, son of the famous Swedish scientist and father of our binomial system of naming plants and animals, beat him to publication in 1782 based on Thunberg's own collections while Thunberg was away in Japan. Flowers of *A. lugens* are unique in this genus of predominantly small blue-flowered species—the virtually black or sometimes dark brown outer tepals represent beetle marks and serve to attract scarab beetles, the pollinators of this species, to the flowers.

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